REMARKS

As a preliminary matter, a revocation and power of attorney and 37 CFR 3.73 statement is submitted with this Amendment. It is requested that Patent Office records be updated to alter correspondence to be directed in accordance with the revocation and power of attorney.

Claims 1-31 were examined. New Claims 32-35 have been added with this amendment. Claims 27-31 were allowed by the Examiner, and the indication of allowable subject matter is appreciated. Claims 27-31 have been amended as to form, and the scope of those claims has not changed. Claims 1-26 were rejected. The specific issues raised in the rejection of claims 1-26 are addressed individually as follows.

Claim 21 is rejected under 35 U .S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner stated that the claims use of "particularly" conflicted with the broader definition set forth by "signals". Claim 21 has been amended to address the Examiner's concerns. The phrase beginning with "particularly" has been deleted in favor of the broader generic recitation of "periodic signals". Thus, Applicant has amended the claim consistent with the broader phrase identified by the Examiner. The amendment is believed to address the rejection.

Claims 1-4, 6-15 stand rejected under 35 U.S.C. 102(b) as being anticipated by Josse, et al. (US 5,852,229). Claim 1 has been amended to address the rejection. With the amendment, claim 1 is believed to be allowable.

The amendments to claim 1 have defined the sensor material as wherein the sensor layer is made of "an oxide ceramic, a non-oxide ceramic or a semiconductor material, a conductivity change thereof modifying the effective electrode surface by a region of the sensor layer." The Examiner correctly recognized that Josse only discloses the use of polymer layers. In addressing claim 13, the Examiner stated that Josse described the use of "organic synthetic of natural polymers". Josse neither meets nor suggest the invention as defined in amended claim 1. Josse does not suggest that ceramic or semiconductor material and does not suggest the conductivity change modifying the effective electrode surface.

Josse's organic layers do not undergo a change in conductivity to effectively change the area of one excitation electrode. Instead, Josse's organic layers undergo changes in visco-elasticity or changes in mass. Josse is focused on providing an organic polymeric sensor layer for measuring an analyte specifically (column 4, lines 31-33, column 8, lines 47-53). The Examiner cites column 8, lines 1-23 for a change in conductivity. There is no disclosure of a change of conductivity of polymer layers in that portion. "To measure a temperature change, a material must be used that changes its conductivity when it is heated or cooled. Semiconductors or ceramics are particularly possible for this purpose." As stated in the background of the present application, "Another disadvantage is that polymer layers are used, so that only a limited bandwidth of environmental influences can be taken into consideration. Furthermore, it is disadvantageous that at least one resonance frequency and at least one anti-resonance frequency must be determined, in order to determine the type and the extent of the environmental influence, respectively, thereby making significant measurement technology structures and computer capacities necessary."

In Josse, measurement of an analyte is always done by measuring the antiresonance frequency (column 12, line 44-50), whereas the series resonance frequency is recognized as being invariant with changes in electrical loading, and is utilized as an additional measurement parameter (column 12, lines 58-61). This is generally also indicated in column 4, lines 48-64, describing that changes in the anti-resonant frequency of the polymeric layer is a critical feature of the invention according to Josse. Josse does not mention the resonance frequency could be changed due to an effective enlargement one excitation electrode due to changes in the electric conductivity of the sensor layer. Accordingly, Josse e.g. in column 4, lines 48-61 uses the change in resonance frequency only for measuring mass density and viscosity.

In Josse, changes of electrical properties of the sensor layer are always measured by the change in antiresonance frequency, as e.g. explained in column 12, lines 51-57, where it is made clear that electrical properties of the sensor layer change the overall electrostatic capacitance, which is then measured as a change in antiresonance frequency. In accordance with this mode of operation, Josse further notes (column 12, lines 58-67), that the series resonance frequency is invariant with

changes in electrical loading, but can still be utilized as an additional measurement parameter. Therefore, Josse clearly describes that the series resonance frequency cannot be used as a measurement parameter, and therefore it is clear to one of ordinary skill in the art that the sensor layers disclosed in Josse do not undergo a sufficient change in electric conductivity to effect a change in resonance frequency, which could then be measured.

Separately, all of Josse's organic based sensor layers rely on their specificity for absorbing an analyte due to functional groups, and do not suggest sensor layer made of a ceramic material, lack the specific binding properties provided by functional groups or by biological Jigand compounds. In the context of Josse, the characterisation of the polymer layers of column 8, lines 33-65 is limited to the description of purely organic, i.e. carbon-based polymer materials, which provide changes in the surface fringing field, whereas changes in the electric field are regarded as negligible (column 8, lines 57-65).

In the following section of col. 9, lines 47-66, Josse describes the electrostatic capacity changes vs. conductivity with relation to Figures 5, 7, and 9. The conductivity changes are always related to the changes in capacitance, and Josse demonstrates that at a conductivity of 0.5 S/m or above, the quartz capacitor behaves as a parallel plate capacitor with identical electrodes on both sides. The relation of conductivity to capacitance shown in Figures 5, 7, and 9 demonstrates that the capacity of the plate capacitor increases with the increase of the conductivity. This effect changes the antiresonant frequency behaviour, but induces no change of the resonance frequency. According to Josse, therefore, conductivity changes of the polymeric sensor layer cannot be measured by the resonance frequency changes (see column 23, lines 58-71), but they are always measured as changes in antiresonant frequency which are caused by the changes in capacitance. The measurement of changes in conductivity is discussed as being insignificant (column 9, lines 17-20), and changes in conductivity are found to be dependent on the loading medium, resulting in "an almost perfect parallel plate capacitor with two identical electrodes" (column 9, lines 35 - column 10, line 11).

When discussing the electric effects in column 8, lines 67 to column 12, line 43, Josse concludes in column 12, lines 43-50 that it is the antiresonance frequency that needs to be measured. In contrast, measurements of the parallel resonance frequency are seen as a result of the loading process (column 11, lines 15-25). Measurement of the resonance frequency in Josse therefore corresponds to measurement of the loading using the resonator as a mass detector, as described in column 3, lines 35-44 with reference to the state of art.

When Josse describes the organic polymer sensor layer in detail in relation to Figures 1a-3c, it is not mentioned that the sensor layer could effectively enlarge the excitation electrode area due to changes in conductivity. There is no suggestion or disclosure that the polymeric sensor layer of Josse could affect the resonance frequency due to enlarging the effective excitation electrode area by changes in conductivity. Therefore, Josse always uses measurement of the anti-resonance frequency, which is indicative of measuring the overall capacitance changes of the resonator device instead of conductivity changes of the sensor layer. This is also summed up in col. 11, lines 31-39, describing that "the series resonance frequency is a function of the mechanical properties of the quartz crystal resonator device and the mechanical properties of the load. As a result, the interaction between the electrical fields and charges (ions, electrons, and dipole) in the contacting medium is related to the antiresonance frequencies of the acoustic wave device."

Therefore, the prior art organic sensor layers do not suggest the invention of amended claim 1.

Claim 5 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Josse, et al. (US 5,852,229) in view of Josse's, et al. prior art figure 4 of the same patent document. The above traversal with respect to claim 1 is incorporated herein.

Claims 16, 17, 19, 20, and 21 (as best understood) stand rejected under 35 U.S.C. 103(a) as obvious over Josse, et al. (US 5, 852,229). Claim 16 has been amended. With the amendment, claim 16 is believed allowable. The amendments to claim 16 are similar to the amendments to claim 1. The bases for traversal regarding claim 1 are incorporated herein.

The new claims are allowable due to their dependency from other claims and because of the additional features therein. Claim 32 defines the periodically running signals. Claim 33 defines the device in clued a second sensor having a sensor layer that is exclusively excitable to vibrations by its excitation electrodes. Claim 34 requires that the piezoelectric materials of the first and second sensors be identical. Claim 35 depends from allowed claim 28 and requires a disc shaped second electrode and a ring shaped third electrode.

For all of the above reasons, Applicant requests reconsideration and allowance of the present application. The Examiner is invited to contact the undersigned attorney at the below-listed number if the Examiner has any questions or would like to discuss any issues related to this application.

Respectfully submitted,

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